



Source: Toxins (Basel) 2011Mar;3(3):242-59. Epub 2011 Mar 18

Title: Aggregatibacter actinomycetemcomitans Leukotoxin: A Powerful Tool with Capacity to Cause Imbalance in the Host Inflammatory Response

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Overview: This review examined the capacity of Aggregatibacter actinomycetemcomitans (Aa) to kill white blood cells by the release of leukotoxins and suggested a mechanism for the pathogenesis of aggressive periodontitis.

Summary:

- A literature review of Aa, periodontitis, leukotoxins etc was conducted.
- Research concluded that leukotoxins expressed by Aa causes death of different white blood cell populations in a variety of ways.
- The mechanisms by which Aa leukotoxin kills leukocytes are closely related to the pathogenic mechanisms of inflammatory disorders such as periodontitis.

Results and conclusions:

- The ability of Aa leukotoxins to cause leukocyte cell death contributes to the ability of the bacteria to survive the immune response.
- Aa leukotoxins mediates activation and release of proteolytic enzymes and proinflammatory cytokines from leukocytes, indicating a more direct role of leukotoxins in the pathogenesis of periodontal diseases.
- Therapeutic strategies that target cellular and molecular inflammatory host responses might be an effective alternative to treating periodontal diseases

Key take-aways:

This study sheds new light on mechanisms of periodontal disease development. Aa leukotoxin kills white blood cells in a variety of ways, allowing the bacteria to survive the immune response and release compounds essential for bacterial growth. Aa leukotoxin was substantially correlated with attachment loss in adolescents, indicating a role for Aa leukotoxin in the pathogenesis of aggressive periodontitis. This is another example of bacteria overtaking the body's metabolic processes for the benefit of the microbe.

Implementation Strategies:

This research reinforces the necessity of knowing which bugs are causing the disease activity. In addition, knowing if your patient is PST+ plays a role in treatment planning, and even more importantly in how you provide periodontal maintenance for this patient. If your patient has Aa, in addition to home care efforts, professional periodontal therapy, oral antibiotics, locally applied antibiotics, laser etc., you may want to include some type

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of regimen that addresses the patients' cellular health. In specific, these patients should have a diet rich in antioxidants enhanced by a high quality nutritional supplement. The current recommendations for a well balanced diet include 9-12 servings of fruits and vegetables per day. Very few people achieve this unless they juice. So pay attention to the quality of supplement you recommend. See the appendix for additional information on supplementation.

Every patient who present with the signs and symptoms of periodontal disease should be tested for the presence of periodontal pathogens and IL-1A & 1B. Once this information is added to the patients' level of risk we can make a customized treatment plan. Prior to this point however, we would have been guessing as to the best way to treat this patient. Keep in mind, most of the patients who fit this profile have no sub-gingival calculus and only moderate amounts of bleeding; *they are your recall patients!*

The question this research is begging us to ask is HOW will knowing this change what you do with the next patient who has 4 & 5mm pockets with moderate bleeding and not so good home care? Is the condition the patients' fault or is the cause bacterial and/or genetic? Is the treatment plan all-inclusive or exclusive? If you are not including something from each of the following categories (The Four Pronged Approach), consider broadening your view.

- Treating disease from the *outside in* includes the use of:
 - Laser
 - LAA
 - Sub-gingival irrigation
 - Professionally dispensed topical treatments
- Treating disease from the *inside out* includes the use of:
 - Healthy diet rich in antioxidants
 - High quality nutritional supplementation
 - Oral Antibiotics if lab recommended
 - Collagenase inhibitors if PST+
- Treating disease from the *top down* includes what the patient does at home:
 - Type and frequency of tooth brushing
 - Interproximal cleaning
 - Professionally recommended topical applications including but not limited to:
 - MI Paste
 - Perio Sciences' Perio Gel
 - Fluoride
 - PerioShield
- Treating disease from the *bottom up* includes:

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- Definitive root debridement by whatever means the clinician deems necessary
- Irrigation with an antimicrobial solution following root debridement
- Laser as indicated
- Application of Locally Applied Antibiotics

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